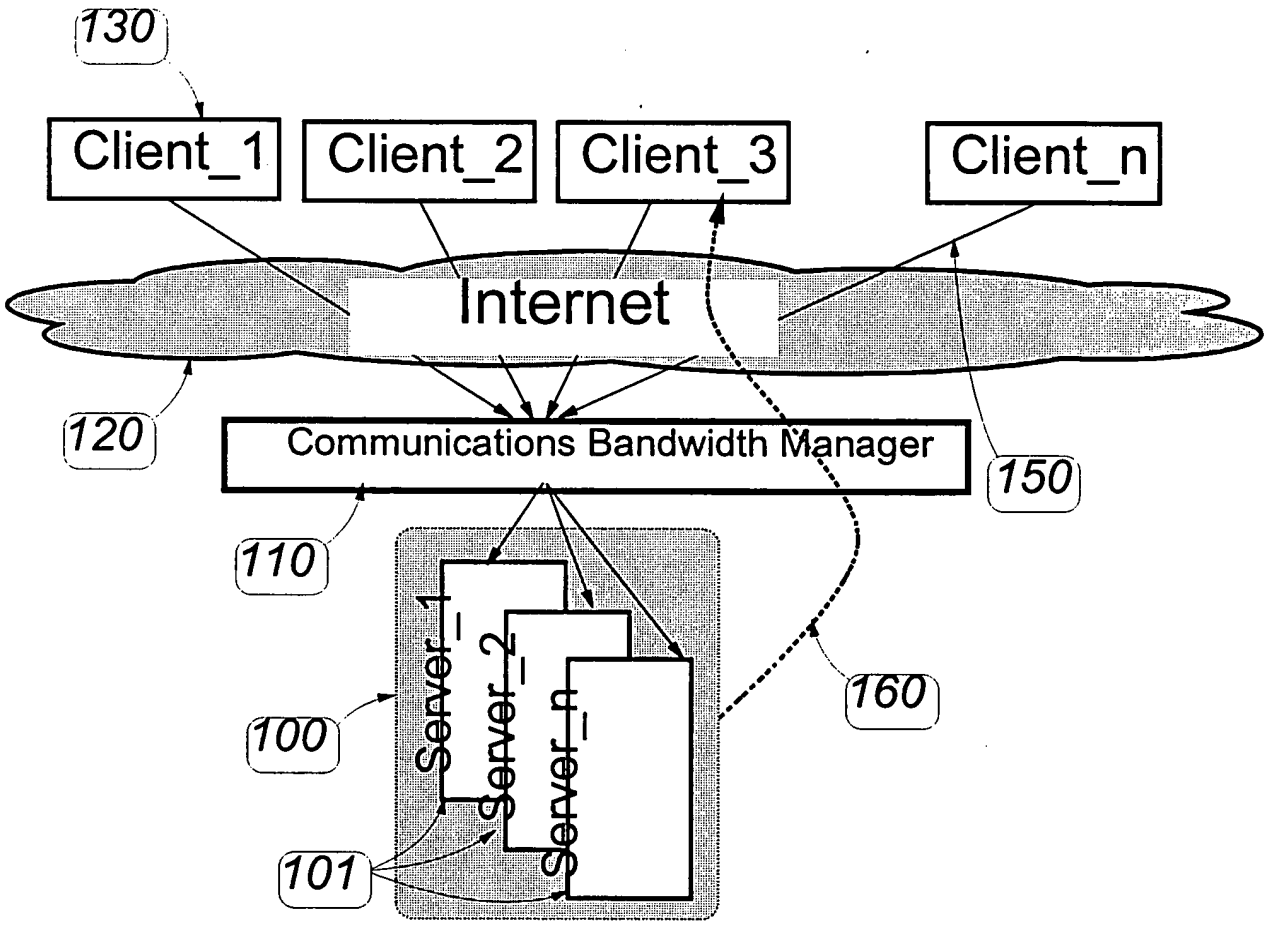
100
130
Client_1
Client_2
Client_3
Client_n
Internet
120
Communications Bandwidth Manager
150
110
Server_1
Server_2
Server_n
160
100
101

Figure 1

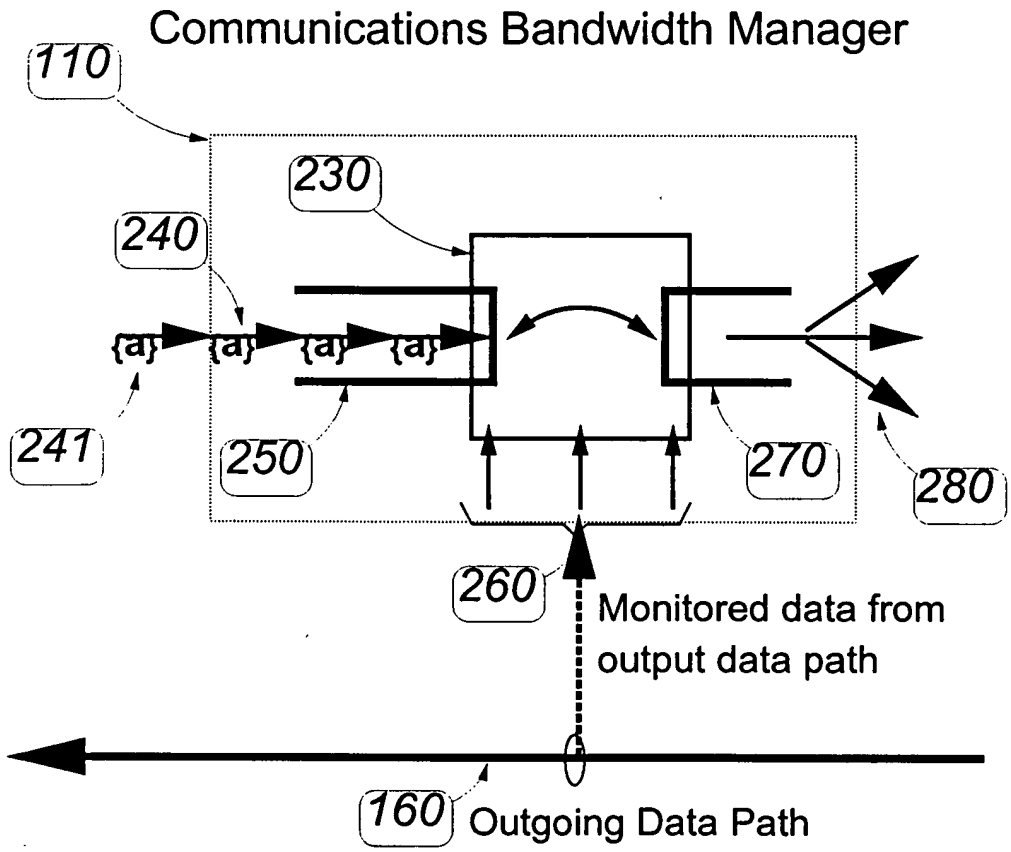
Communications Bandwidth Manager
110
230
240
{a}
{a}
{a}
{a}
241
250
270
280
260
Monitored data from
output data path
160
Outgoing Data Path

Figure 2

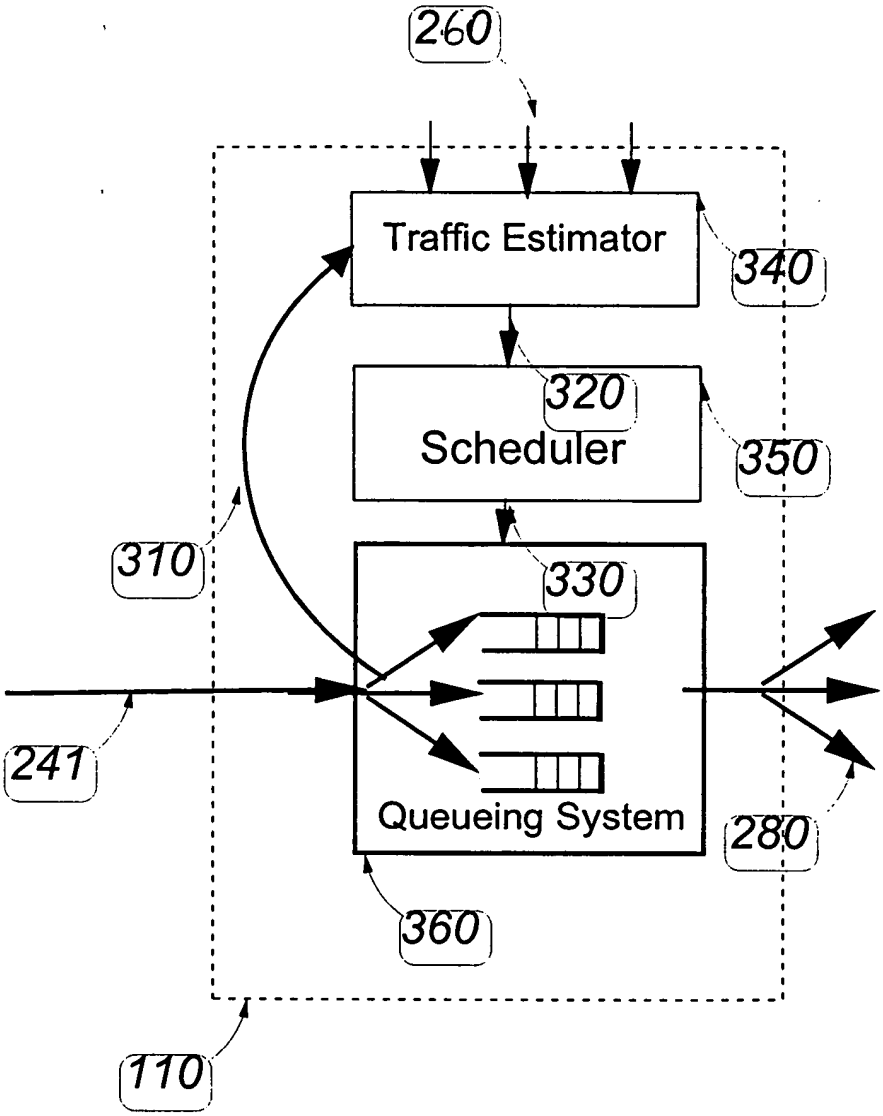
260
Traffic Estimator
340
320
Scheduler
350
310
330
241
Queueing System
280
360
110

Figure 3

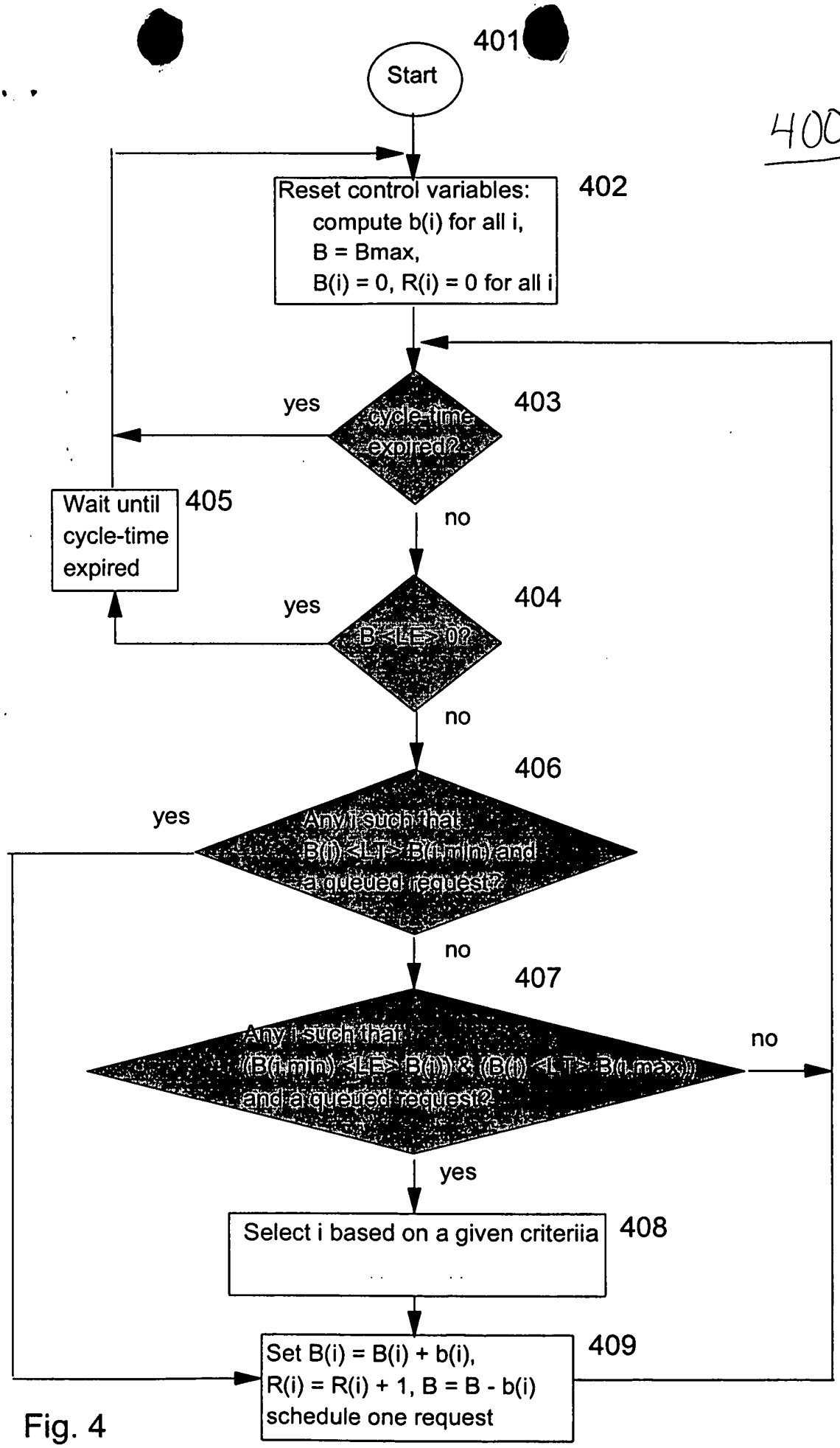
401
Start
400
Reset control variables:
compute b(i) for all i,
B = Bmax,
B(i) = 0, R(i) = 0 for all i
402
yes
cycle-time expired?
403
Wait until cycle-time expired
405
no
yes
B <LE> 0?
404
no
406
yes
Any I such that B(i) <LT> B(i,min) and a queued request?
no
407
Any i such that (B(i,min) <LE> B(i)) & (B(i) <LT> B(i,max)) and a queued request?
no
yes
Select i based on a given criteriia
408
Set B(i) = B(i) + b(i),
R(i) = R(i) + 1, B = B - b(i)
schedule one request
409

Fig. 4

For all i

Ra(i) = (1 - a)Ra(i) + aR(i),

Ba(i) = (1 - a)Ba(i) + aBm(i),

b(i) = Ba(i) / Ra(i).

where

Ra(i) represents averaged/smoothed number of requests

Ba(i) represents averaged/smoothed bandwidth usage

Bm(i) represents the measured/monitored bandwidth usage all in a service cycle time, and

b(i) represents the expected bandwidth usage by a one request

Fig. 4B